

CU IN THE WOODS

Clemson Extension Forestry and Wildlife Newsletter



Clemson Extension's CU in the Woods Newsletter Wins Notable State Document Award

By Jonathan Veit, PSA Communications

Clemson Cooperative Extension has won another award for its excellence in imparting the latest science-based information to South Carolina citizens.

The Clemson Extension newsletter CU in the Woods was named to the 2020 South Carolina State Library's Notable State Documents list.

The quarterly newsletter is a key communications tool for Extension's Forestry and Wildlife Program. It features information and videos on best practices for managing forestland and wildlife, the latest news on pests and diseases, lists upcoming Clemson Extension forestry events and includes a quarterly South Carolina forestry market report.

The newsletter is edited by Clemson Extension Agent Jaime Pohlman and distributed to subscribers by email and archived at <https://www.clemson.edu/extension/forestry/newsletter/index.html>.

"CU in the Woods is produced by a dedicated team of Clemson Extension agents who provide valuable content focused on making sure forestland owners have the very best science-based information for managing their forestland. We are honored to receive this award, and I could not be prouder of our team for producing such a valuable informational tool," Pohlman said.

Winning documents for 2020 were selected by judges, including State Library staff members, document librarians from around the state and state employee representatives. The documents were graded based on design, writing style and breadth of information. Leesa Aiken, state library director, said the annual award showcases some of the strongest work completed by state agencies.

"South Carolina state documents awards began in 1991 to recognize exceptional documents published during each calendar year which add value and assist South Carolinians with their daily lives. It's clear that our winners are passionate about what they do and the people who they serve," Aiken said.

The Extension publication, Common Weeds and Wildflowers, written by Bert McCarty, was declared a Notable State Document in 2019 for the 2018 calendar year. In 2018, the Clemson Extension website, www.clemson.edu/extension, was



Clemson Extension Forestry and Wildlife newsletter editor Jaime Pohlman. Photo Credit: Sandee Sappenfield, Clemson Extension.

UPCOMING EVENTS

Woman Owning Woodlands Introductory Workshop

September 25th from 9 am to 5 pm.

Greenville County

Cost: \$20 for first person and \$10 for additional family members. Registration will open mid-August

Contact Janet Steele for more information- jmwatt@clemson.edu

Chainsaw Safety and Training

October 16th in Clemson

November 20th in Columbia

March 2022 at Sandhills State Forest

Workshops will run from 9am- 2pm.

Contact Janet Steele for more information- jmwatt@clemson.edu

Carbon Market Webinar

August 10th from 6:30- 8:30pm

1 CFE Available

Contact Carolyn Dawson for more information- dawson4@clemson.edu

Click here to register: <https://bit.ly/3io88zN>

Longleaf Pine Management & Landowner Incentives

August 24th from 9- 11:30am

Orangeburg County Extension Office

Contact Janet Steele for more information- jmwatt@clemson.edu

Longleaf Pine Management & Landowner Incentives

August 31st from 7- 8:30pm

Allendale County Extension

James Brandt Building Auditorium

Contact Stephen Pohlman for more information- spohlma@clemson.edu

Upcoming Tours/ Field Days

August 10th- Sandhill REC Tour

August 17th- Sandhill REC Tour

August 25th- McCrary Tree Farm Tour (Fairfield County)

September 9th- Pee Dee REC Agriculture and Forestry Field Day

Contact Ryan Bean for more information: rbean@clemson.edu

CFE Opportunities:

You can find a list of current CFE opportunities at this website:

https://www.clemson.edu/extension/forestry/continuing_education/index.html

More Events:

You can find a list of more events at this website:

<https://www.clemson.edu/extension/forestry/events.html>

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Notable State Document Award Cont.

named to the 2017 South Carolina State Library's Notable State Documents list. Impacts Magazine was named to the list in 2015.

"Clemson Extension's mission is to impart unbiased, research-based information to the citizens of South Carolina," said Thomas Dobbins, director of Clemson Extension. "CU in the Woods is just another example of the many ways Clemson Extension has worked to continue meeting the needs of South Carolinians throughout the pandemic. I am proud of Jaime and the entire Forestry and Wildlife team for producing such high-quality information to help improve the lives of South Carolinians."

The awards were presented remotely to the winning agencies and authors on April 28 from the South Carolina State Library in Columbia.

Documents declared Noble State Documents, as well as other state government publications, are available online through the State Documents Depository. State library staff also are digitizing paper records and saving born-digital documents available through state agency websites. These publications provide information about state government, including statistics, annual accountability reports and data on a wide variety of topics related to the state.

<https://news.clemson.edu/clemson-extensions-cu-in-the-woods-newsletter-wins-notable-state-document-award/>

Your Final Harvest is Complete: So, What's Next?

By Tom Brant

Many timberland owners will only final harvest their timber one time in their lives. Once harvested, they are faced with something they have not dealt with before, what to do with the cutover land. If they have plans to convert it to another use like pasture, cropland, or possibly some type of development, they can get started with those processes. If they plan to sustainably manage a forest for the future either for themselves, their heirs, or for conservation purposes, they will need to get to work cultivating the next stand of timber. For most owners in the southeastern US, this will mean replanting the land with one of the southern yellow pine species. But before they can start putting seedlings in the ground, they must prepare the site for planting. The process is called site preparation or site prep for short. Just like you would prepare a new lawn for seeding or turn over a garden before planting your vegetable seeds or seedlings, you must prepare the cutover land for the tree seedlings. Like in a garden spot, your site prep goal is to reduce the amount of unused material, diminish the competition from undesired plants, and prepare the soil for the new seedlings.



If you have a large amount of logging debris and uncut stems you may need to use heavy equipment, like this shearing blade equipped dozer, to clear your site. Photo: Tom Brant.

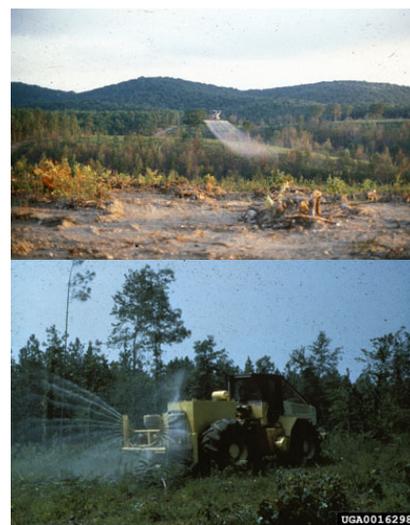
The site prep process begins with the final harvest by reducing the

amount of unused material left on the site. The more trees you can harvest from the site, and the more of each tree you can completely utilize, the better off you will be. It is not just harvesting the main stem but also the tops, limbs, and other pieces. By removing excess debris from

the site and taking them to a mill or other processing facility, less effort will be needed to prepare the site for the next timber stand. So, work with your forester and the harvesting crew to completely utilize what you have been growing for those many years.

Once the trees are removed, you will have to take stock of what is left. But before doing this, you need to give the site time to rest. You will want to evaluate what type of vegetation will start growing or resprouting on the site. Depending on the time of year the harvest occurred, it may take several months to see what is growing. Once it is clear what the competing vegetation consists of and how much of it there is, you can begin your next step of the site prep plan by determining how you will control it. There are many options to reduce competition. One method uses machinery to push over and pile up the material. Another uses a different type of machinery to chop it up to small pieces. Other options include the use of EPA-approved forestry herbicides or the application of prescribed fire. There are other methods available also, and sometimes a combination of methods may be used.

The last part of preparing the site is evaluating your soil. You may not need to manipulate the soil in any way. But there are a few things to consider. Was the last stand limited by the prior use of the site? Was the site



Ground or aerially applied EPA approved forestry herbicides are often the most cost-effective method of competition control. Photos: forestryimages.org.

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Your Final Harvest is Complete: So, What's Next? Cont.



The use of a bedding plow to create raised planting beds can be used to manipulate wet soils. Photos: Tom Brant.

old agricultural land in the past that may have a hardpan layer at some depth that limited tree root development in the last stand? There are management options that will fracture this hardpan and remove its limitations of the site. Is your site wet natured? Could the seedling roots be drowned by standing water? This can be remedied by using equipment to create raised beds to plant the seedlings in, to get

them above the standing water. Finally, is there a lack of nutrients available on the site? A soil test can determine this, and any deficiencies can be alleviated by applying the needed fertilizer.

Site prep can be a daunting process. Forest landowners must determine which practices to apply and then coordinate with contractors to ensure the work is done correctly and in a timely manner, to stay on schedule for the replanting. Keep in mind that multiple contractors may be required to complete the site preparation and tree planting. For most landowners, working closely with an experienced professional forester will ensure a proper timeline to successfully re-establish their forest land. If you don't have a forester you work with, contact your local Clemson Extension Office for assistance with finding one.

<https://blogs.clemson.edu/fnr/2021/07/14/your-final-harvest-is-complete-so-whats-next/>

Improving Flora Diversity for Wildlife

By W. Cory Heaton

The concept of maximizing flora diversity is nothing new. While it may have slipped by unperceived as we beat our way through the daily grind of managing lands, our management practices were promoting diversity in many ways. Whether we were burning old fields, conducting thinnings, protecting wetlands, controlling non-native species, daylighting roads, etc., we were, in fact, promoting flora diversity. Drawing back to your earliest biology lessons, I am sure you realize the importance of plants. Unfortunately, very few (including myself) truly understand just how important plants are. Sure they play a big role in oxygen and carbon dioxide cycles, serve as the primary producers in food chain systems, provide critical habitat to wildlife species, cleanse runoff and protect watersheds, and provide countless materials important to civilization (food, fiber, medicine, etc.). Even still, there are countless services provided to this planet by plants. The benefits of flora diversity are no surprise to serious wildlife managers. Looking at species trends across the globe, it is pretty easy to recognize that the most diverse wildlife communities are almost always in the areas with high flora diversity.

In order to successfully plan for improving flora diversity, it is important to consider a few things. What plants are present on the landscape currently? How are plant communities distributed across the landscape? What percentage of the property is in commercial timber? What are the age class distributions of pine plantings? Are there areas on the property that may harbor unique plant communities? Ephemeral wetlands, forest coves, pockets of distinctly different soils, etc.?

Once you understand what is currently available, you can begin to develop a plan of action for increasing flora

diversity. In most situations, we can increase diversity without planting anything. It's as simple as providing an opportunity for plants to grow. Many management practices accommodate this. In forested landscapes, thinning timber allows sunlight to reach the forest floor, which will promote vegetative growth. By diversifying thinning rates or stand densities, we can develop a broader catalog of plant species present. Consider developing a mosaic of stand densities within commercial timber stands.

Prescribed fire is an extremely important tool for managers looking to diversify flora. Typically, land managers attempt to get all of their burns completed in the short period between late fall and late winter. While this time frame is well suited for encouraging native plant regeneration, it will likely fail to help the property meet its diversity potential. Fire can be manipulated in several ways to encourage plant diversity. First, fire timing and frequency play a big role in determining which species repopulate the area. If all burns are conducted in a short period of time, the respective flora communities will be comprised of similar species. Managers who have the ability to burn throughout the year will quickly see the difference in plant communities for respective burn times. Sure there will be many species that overlap each burn time, but each will likely contain a few species not found in other burn time periods. The more diverse we make our burn times, the greater the possibility of reaching our flora diversity potential. The same can be said for burn frequency. Burning everything annually or biennially may bottleneck our potential. Diversifying burn timing and frequency can have a huge impact on species diversity on most properties. Another important variable with respect to fire is intensity. Fire intensity can be manipulated thru

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Improving Flora Diversity for Wildlife Cont.

firing technique, weather conditions, fuel availability, etc. The firing technique is the easiest way for managers to diversify fire intensity across the landscape. It doesn't all have to be back fires and strip head fires. Mix it up. Ideally, the property should be a mosaic of various firing times, frequencies, and intensities.

Another technique is softening edges. The concepts of feathering forest edges, field borders, and daylighting roads are well known for their value to wildlife communities. These practices typically produce plant diversities greater than either of the two habitats they separate. It is common to find wildlife and plant species representative of interior and edge communities intermingled where we have softly transitioned from one plant community to another. Developing smooth transitions from one forest stand to another is rarely done, but this can easily be incorporated into harvesting and replanting operations. On large commercial timber operations, feathering edges between every timber stand can provide substantial wildlife habitat. Managing these feathered areas to prevent them from reverting to dense forests ensures the plant communities and wildlife habitat will persist thru the aging of the forest stands.

Invasive species management is another method of promoting flora diversity. Invasive species tend to take over areas and greatly restrict species richness. In South Carolina, privet is a great example. Chinese privet has made its way across our beautiful state, and many of our hardwood bottoms and riparian forest understories are now dominated by privet. The ability of privet to shade out the forest floor can be devastating to native plant communities. Regardless of the invasive species present, we have the tools to reduce, control or possibly eradicate the invasive. Herbicides are often the tool of choice for removing invasives from the landscape. Some situations require mechanical methods combined with herbicide applications. Efforts to control invasives can be rather daunting and often disappointing. The key is to stay persistent. In the case of species like privet, the manager may find themselves locked in an eternal battle of good versus evil. It becomes easier to tackle the annual control efforts once the rewards become visible. Species, hopefully desirable species, will fill in when the invasives are controlled.

Planting is another method of increasing flora diversity. Today's managers are fortunate in that there are a multitude of native plant nurseries. A quick internet search will locate several options for just about any native grass, herb, shrub, or tree species you wish to plant. One can also harvest desirable seeds or seedlings throughout the year. Regardless of whether we are discussing old field habitats or mature hardwood forests, the goal is to improve diversity by incorporating native species not currently present or plentiful. Forest may benefit from selective removal of dominant or undesirable species.

Following the removal of selected trees, desirable tree species can be planted in the openings. Forest stands frequently lack sub-canopy structure. Consider incorporating native shade-tolerant shrub species and understory herbaceous plants. This will not only improve diversity but also assist with developing a quality multi-layer forest. Old fields and open areas can be planted with a wide variety of native grasses and broadleaf plants. Native plant nurseries can custom blend a seed mix to supplement the species currently present at the site. These seed mixes can be developed to support a variety of desired wildlife species, from butterflies to deer.

Opportunities to improve flora diversity go far beyond the methods mentioned in this article. The most important thing to remember is flora diversity requires management diversity. We have to manage with developing a mosaic of plant communities in mind. Break up those burn blocks, and broaden your burn timing, frequency, and intensities. Let's get some sunlight to the ground in those forest stands. Don't be afraid to incorporate plantings of desirable species. Keep the invasives in check, and let the good times roll.

<https://blogs.clemson.edu/fnr/2021/07/14/improving-flora-diversity-for-wildlife/>

Management Practice Examples

The image to the right show a collection of native grass and herb seeds for future plantings. Seeds collected in this manner may be carefully planted into well-prepared seed beds. Seeds may also be overseeded into existing plant communities.

Monitoring plant growth throughout the year will allow the manager to know where to go to harvest species needed for flora diversity improvement projects.



Photo credit: W. Cory Heaton.



Photo Credit: W. Cory Heaton

This photo on the left is an example of a field border was planted with native warm-season flower mix adjacent to young longleaf pine stand at Clemson's Sandhill Research and Education Center.

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Improving Flora Diversity for Wildlife Cont.



Photo Credit: W. Cory Heaton

This is photo on the left is an example of a field border along cattle pasture in Chester County. This project relied solely on natural regeneration and selective removal of non-desirable species. These borders are invaluable to native songbirds, pollinators, and game birds. They represent

a significant increase in flora diversity compared to the agriculture fields they border.

Photos to the right and below are examples of native plant regeneration following herbicide applications to control invasive Chinese privet in Chester County.

This example shows herbaceous species regenerating following herbicide application to privet. The goals of this project were to control privet and to soften the edge between a forested area and adjacent ag lands.



Photo Credit: W. Cory Heaton

In this example, herbicides were used to control privet in a Chester County hardwood bottom. After several years of privet control efforts the shrub layer filled in with Pawpaw.



Photo Credit: W. Cory Heaton

Example of a low intensity prescribed fire that was conducted at Clemson's Edisto Research and Education Center in Blackville, SC in this photo to the right. The goal of this burn was to promote understory development, and thus increase flora diversity within the stand.



Photo Credit: W. Cory Heaton

Images to the right and below are of pollinator habitat demonstration areas that have been installed at Clemson's Pee Dee and Sandhill Research and Education Centers.

These areas were planted with a diversity of native annual and perennial flowering plants and warm-season grasses. They are being managed with prescribed fire or light disking. The additions to the plant community provided by these areas are beneficial to a wide array of wildlife species.

A diversity of native annual and perennial flowering plants and warm season grasses were planted in the demonstration areas.

Early successional plant community management demonstration areas were installed at Clemson's Sandhill Research and Education Center. In this demonstration area, a utility right of way was divided into 1/4 -1/2 acre plots. Plots were assigned to one of the following treatments: annual growing season disk, biennial growing season disk, annual dormant season burn, biennial dormant season burn. The patchwork of disturbances produces a diverse array of native grasses and broadleaf plants.

The image to the right shows a prescribed burn conducted in the Early successional plant community management demonstration at Clemson's Sandhill Research and Education Center.

The image to the right shows a view of the utility right of way demonstration area.



Photo Credit: W. Cory Heaton



Photo Credit: W. Cory Heaton



Photo Credit: W. Cory Heaton



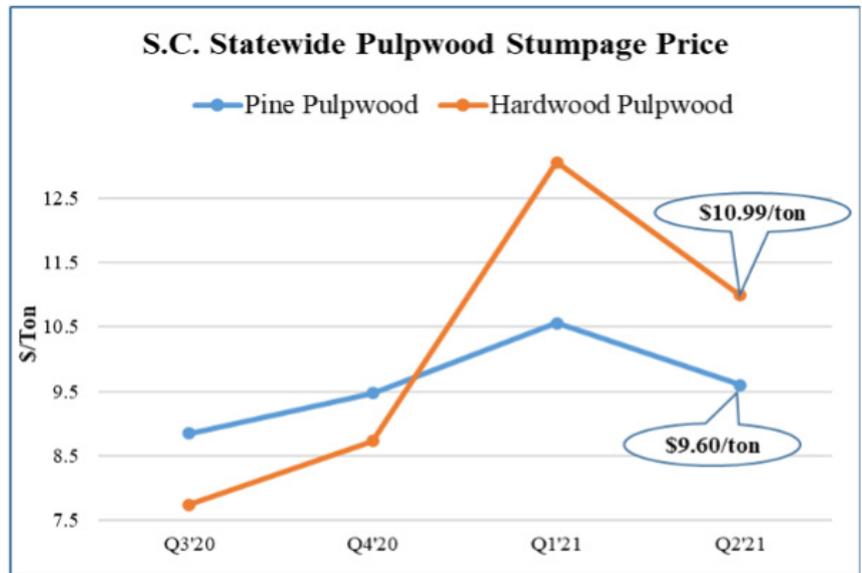
Photo Credit: W. Cory Heaton

Analysis of South Carolina's Stumpage Market Trends in the Second Quarter of 2021

By Puskar Khanal

South Carolina Pulpwood Stumpage Price Trends:

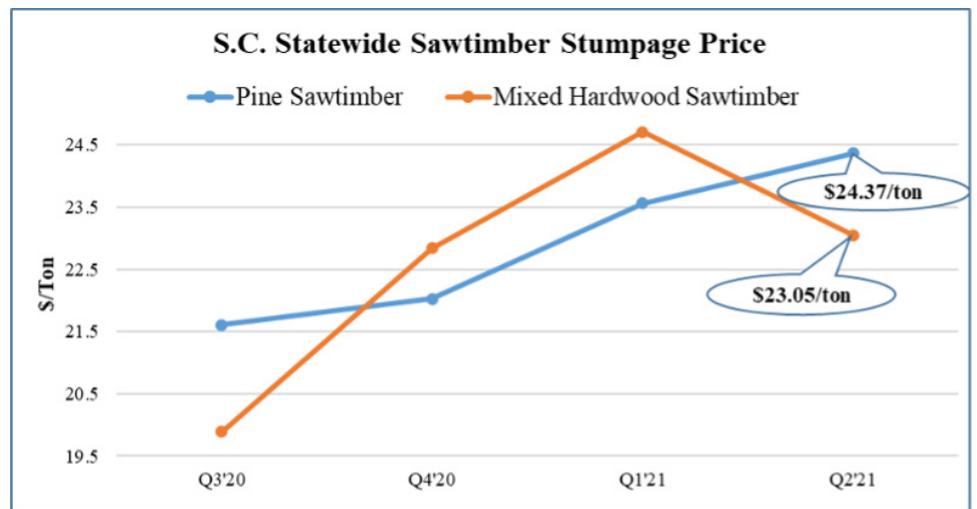
Statewide pulpwood stumpage prices for both pine and hardwood were lower than the rates observed in the previous quarter. On average, South Carolina statewide pine pulpwood prices were \$9.60/ton in the 2nd quarter of 2021. For mixed hardwood pulpwood, the statewide stumpage prices, on average, were \$10.99/ton in this quarter. A slight market adjustment was observed in the pulpwood market for both pine and mixed hardwood as economic activities get back to normal. In this quarter, pine pulpwood had lower percentage decline on average prices than the mixed hardwood rates observed last quarter.



Graph of the S.C. Statewide Pulpwood Stumpage Price

South Carolina Sawtimber Stumpage Prices Trends:

Pine sawtimber stumpage prices have continued their upward trajectory, but hardwood sawtimber prices started to decline in this quarter in South Carolina. Mixed hardwood sawtimber had statewide average prices of \$23.05/ton in the second quarter of this year. On average, South Carolina statewide pine sawtimber prices were \$24.37/ton in the 2nd quarter of 2021. In the previous two quarters, hardwood sawtimber prices were higher than the pine sawtimber rates, but the trend has reversed from this quarter. In general, the stumpage market is now coming out of the COVID-induced shock experienced during much of 2020.



Graph of S.C. Statewide Sawtimber Stumpage Price

Data credit: The sawtimber and pulpwood price data included in this newsletter are published with permission from TimberMart-South Athens, GA 30605 email tmart@timbermart-south.com.

<https://blogs.clemson.edu/fnr/2021/07/16/analysis-of-south-carolinas-stumpage-market-trends-in-the-second-quarter-of-2021/>

Chainsaw Usage: Girdling and Herbicide

By Stephen Peairs

Chainsaws are synonymous with forestry. Loggers use them to fell timber on steeper terrain and process logs to length (also referred to as “bucking”). Wildland firefighters use them to drop flaming snags near fire breaks and displace burnable fuel. Landowners can also use them to facilitate active forest management. Management practices could be for wildlife: edge feathering, standing dead snag creation, or hinge-cutting; or forestry: early or mid-rotation timber stand improvement practices, pruning, creating canopy gaps or midstory/understory control to enhance regeneration efforts. For most of these activities, ring girdling of trees may be a sizable component of the job specifications. The landowner should be well-aware of how to perform this operation safely and efficiently. After all, a little “sweat equity” from using a chainsaw tends to increase eagerness to conduct resource management endeavors and self-approval after completion!

Personal Protective Equipment

First and foremost, safe chainsaw operation is paramount to job implementation. The person who engages in chainsaw use should utilize appropriate personal protective equipment (PPE) to safeguard one’s well-being. The “DIY” sawyer should have (at a minimum) chainsaw chaps, a helmet/hardhat, eye protection, hearing

protection, gloves, thick leather work boots, and water for hydration.

*A general rule of thumb the author picked up during wildfire detail: 3 bottles of Gatorade® (electrolytes).

Chainsaw safety is a top priority! If one is not equipped or mentally/physically prepared, postpone implementation...one mistake is all it takes to create a “bad day” in the field or worse!



PPE and assorted equipment for chainsaw use. Photo Credit: Stephen Peairs.

Additional suggested items include a wedge (for both directional felling and to assist with extracting bound saw blades), hammer/hatchet to drive a wedge, chainsaw sharpening kit (a sharp set of teeth reduces labor time), 2-way radio, and a high-visibility vest. Snake-proof boots also give “peace of mind” to the sawyer when circling the base of trees or moving between trees during girdling! Ring girdling is probably the “safest” form of chainsaw use that can be executed in forest management. Large trees can be girdled instead of felled, and cuts (girdles)

County Forestry Associations

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Abbeville County Forest Landowners Association
Contact: Tom Brant
jbrant@clemsun.edu

Edgefield County Forestry Association
Contact: Stephen Pohlman
spohlma@clemsun.edu

Lowcountry Landowners Association (Beaufort, Colleton, Hampton, Jasper)
Contact: Janet Steele
jmwatt@clemsun.edu

Saluda County Forestry Association
Contact: Stephen Pohlman
spohlma@clemsun.edu

Aiken County Forestry Association
Contact: Stephen Pohlman
spohlma@clemsun.edu

Greenville Forestry & Wildlife Society
Contact: Carolyn Dawson
dawson4@clemsun.edu

McCormick County Forestry Association
Contact: Tom Brant
jbrant@clemsun.edu

Sumter County Forest Landowner Association
Contact: Ryan Bean
rbean@clemsun.edu

Anderson Forestry & Wildlife Association
Contact: Carolyn Dawson
dawson4@clemsun.edu

Greenwood County Forestry Association
Contact: Tom Brant
jbrant@clemsun.edu

Newberry County Forestry Association
Contact: Jeff Fellers
fellers@clemsun.edu

Tri-county Forestry Association (Berkeley, Charleston, Dorchester)
Contact: Parker Johnson
pdjohns@clemsun.edu

Calhoun-Orangeburg Forest Landowners Association
Contact: Janet Steele
jmwatt@clemsun.edu

Kershaw County Forest Landowner Association
Contact: Ryan Bean
rbean@clemsun.edu

Salkehatchie Forestry Association (Allendale, Bamberg and Barnwell)
Contact: Stephen Pohlman
spohlma@clemsun.edu

Williamsburg County Forest Landowners Association
Contact: Sean Bowers
sbower3@clemsun.edu

Chesterfield County Forestry Club
Contact: Ryan Bean
rbean@clemsun.edu

Laurens County Forest Landowners Association
Contact: Tom Brant
jbrant@clemsun.edu

Darlington/Florence Landowners Association
Contact: TJ Savereno
asavere@clemsun.edu

Lexington County Forestry Association
Contact: Janet Steele
jmwatt@clemsun.edu

Contact the Association nearest to you to find out about upcoming meetings!

Chainsaw Usage: Girdling and Herbicide Cont.

can be directed at a comfortable height (waist level). The procedure involves cutting a complete (ring around the entire stem circumference) single ring or double rings around the targeted stem. Literature suggests that a minimum of 4 up to 8 inches or greater be between double girdles.

Cutting depth should penetrate past the cambium and phloem (into the xylem) to a depth of approximately 1.5 inches to successfully “starve” the tree.



Double ring girdles separated by more than 8 inches. Photo Credit: Stephen Peairs.

has suggested that plants are most vulnerable in the early growing season from spring to early summer (Kilroy and Windell 1999). Early summer cut surface treatments have been suggested to be optimal for controlling basal sprouts (Clark and Liming 1953). Cut surface treatments (with herbicide) applied in the growing season yielded the best overall efficacy (Ballard and Nowak 2006). Treatments in the growing season will promote the depletion of carbohydrate reserves in the root system. Mid-winter through early spring may provide adequate results for some species such as sugar maple and hickory but inferior effects on other species such as blackgum (Rathfon and Saunders 2012). Mortality of stems may occur in the first year but could take multiple years before the tree finally dies.

Number of Girdles & Herbicide Use

Time is fleeting and precious to all landowners. Thus, labor time can likely be reduced if trees only need to receive one ring girdle, but is only one girdle sufficient to both top-kill and eliminate basal sprouting? This answer varies by species and the size of the stem being targeted. According to Rathfon and Saunders (2012), single rings induce less mortality and higher sprouting than double rings in some hardwood species. Wiant and Walker (1961) considered ring-porous (oak) species to be more easily killed than diffuse-porous species (maples, cottonwood, gum, black cherry, etc.). *Potential exception: The author has observed elm (ring-porous) to be difficult to deaden via single ring girdling, however. Rathfon and Saunders (2012) also discovered blackgum was more difficult to control as opposed to the high effectiveness of girdling

results from upsetting the carbon/nitrogen balance and auxin production/distribution throughout the tree (Noel 1970).

Seasonal Timing

Most chainsaw enthusiasts prefer to be active in the cool season to alleviate heat, pests, and humidity.

However, research

applied to hickory and sugar maple. “Difficult” species will likely need more intensive measures (double girdling with herbicide) and have the treatment applied during the growing season (the 2012 study was performed in February). The study also indicated that the addition of herbicide sprayed into the single rings improved control of sprouting, which is highly beneficial when attempting to eliminate the targeted species’ ability to regenerate. For more difficult species being treated in the spring, a double ring girdle with herbicide applied in the top ring should be effective. Applications to lower rings in species with heavy sap flow (such as maples) may push herbicide out of the girdle if treatments are applied in early spring.

Girdling some species without the addition of herbicide may encourage sprouting, resulting in more labor required of the landowner. Species such as tree of heaven (*Ailanthus altissima*), black locust (*Robinia pseudoacacia*), Russian olive (*Eleagnus sp.*), Chinese tallow (*Triadica sebifera*), sassafras (*Sassafras albidium*), etc. are prone to sprout from the rootstock. As the reader may be aware, most of the aforementioned are invasive plants. In such instances, a herbicide is often required to adequately control infestations!

A counterpoint to herbicide uses in girdling applications is flashback. Flashback is the unintentional uptake of soil active ingredients (such as imazapyr or picloram) into adjacent non-target trees of the same species that may have grafted at the roots. It is likely that species with more accelerated growth rates, such as yellow-poplar and American sycamore (personally observed in these two species, in field settings by the author), have higher susceptibility.

Differing species do not appear to readily translocate herbicide to one another. Root grafting is common with trees of the same species in close proximity. In such instances, indirect uptake could be a potential issue. To help minimize the potential impact of herbicide, the applicator could reduce the amount of soil active herbicide and create a solution containing a non-soil active herbicide. This mixture should reduce the deleterious effect of flashback while also enabling a greater range of control of tree species being treated. An example would be imazapyr concentrate (Arsenal AC® or Polaris AC®) at 10% coupled with triclopyr amine (Garlon 3A®) at 50% of the solution mix, respectively. Harper (2020)



Girdled stems that fell (unexpectedly) some duration after the initial treatment. This added to the downed woody debris in the stand. Photo Credit: Stephen Peairs.

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Chainsaw Usage: Girdling and Herbicide Cont.

suggests that this mixture is optimal for controlling both a greater range of species while minimizing the potential for flashback. Trees typically die within 3 – 4 months after treatment.

The land management practitioner must ultimately discern application delivery to individual stems within the stand to avoid unfortunate outcomes. For some species, avoiding soil-active herbicides (or at least reduced percentages in solution) may be necessary to avoid flashback. For others, such as the invasive root sprouts, herbicide use is strongly advised. Difficult species may require more than one girdle, with or without herbicide. Exercise safe protocol every time a chainsaw is to be in operation! Best of luck with your management endeavors.

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<https://blogs.clemson.edu/fnr/2021/07/14/chainsaw-usage-girdling-and-herbicide/>

Differentiating Between Loblolly, Longleaf, and Other Southern Pines in the Woods

By Ryan Bean

Traveling throughout South Carolina, there is no question you will encounter pine trees. Depending on the region of the state you are traveling through, you may be seeing several different species. Still, no matter where you find yourself, once you step out into the woods, you most certainly will find there are more species present than what may be seen from the road. South Carolina is host to 10 native species of pines, including: Loblolly, Longleaf, Slash, Pond, White, Table Mountain, Pitch, Shortleaf, Virginia, and Spruce Pines. While several of these species are important to the timber industry, others are hidden in the shadows of the forest. When it comes to differentiating between pines, it requires looking at the details. For the purposes of this article, we will look at several of the most commonly encountered species.



Loblolly Pine. Photo Credit: A.C. Moore Herbarium, University of South Carolina.

Loblolly Pine (*Pinus taeda*) is without a doubt one of the most common species of pine found in SC. It can be found growing on high and dry sites as well as low and wet. It grows well on most sites but prefers rich soils and responds well to those sites. Loblolly pine needles are grown primarily in bundles, or fascicles, of 3 but can also be found in bundles of 2 or 4 and are typically 5 to 6 inches long. The bark of young loblolly pines is very dark and scaly, while mature bark is divided by deep furrows and dark brown in color. Cones are 2.5 to 4 inches long, have sharp prickles, and can remain on the tree for three years which is often a useful distinction. Loblolly pines average

80 to 100 feet in height, with the greatest variation being related to the site quality.



Longleaf Pine. Photo Credit: A.C. Moore Herbarium, University of South Carolina.

Longleaf Pine (*Pinus palustris*) once covered much of the land in SC but was heavily harvested by early settlers. Longleaf pine needles are grown in fascicles of 3 and can reach up to 18 inches in length, lending to its namesake, but are typically 8 to 12 inches long. Bare twigs are very stout and often referred to as “thumb-size” and have a rough surface left behind by previously dropped needles. Cones are 6 to 10 inches long with prickles bending downwards to the base of the cone. The bark

of longleaf pine is often very thick compared to other species with an orange-brown appearance. This species is highly adapted to growing on poor sites which are often sandy in nature and prone to the occurrence of fire. This is the only species in SC that exhibits a grass stage when young. This growth stage can last several years before the tree shoots up several feet in one growing season. These growth adaptations are in response to frequent fire and made in an effort to get its terminal bud out of danger as well as above competing vegetation following a fire event. During the Spring of each year, it is easy to identify longleaf pine by their white fuzzy terminal buds extending from the tips of twigs before new needles begin to emerge. These white buds are often referred to as “candles” or “candling.”

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Differentiating Between Loblolly, Longleaf, and Other Southern Pines in the Woods Cont.



Slash Pine. Photo Credit: A.C. Moore Herbarium, University of South Carolina.

Slash Pine (*Pinus elliottii*) can often be confused with both loblolly and longleaf pines as it has a similar appearance once mature and grows on similar sites. Slash pine needles are grown in fascicles of 2 or 3, are typically 8 to 10 inches long, and are crowded near the end of branches. Twigs of slash pine are not as stout as longleaf pine but more similar to loblolly pine. Cones of slash pine are glossy brown in appearance which is a distinguishing feature when comparing to loblolly pine which also has more pronounced

prickles on its cones. Slash pine can be found growing on many of the same sites but naturally occurs in wet areas where you wouldn't normally find longleaf pine.

Shortleaf Pine (*Pinus echinata*)

is found primarily in the piedmont range of SC. Needles of shortleaf pine are 2.5 to 4.5 inches long and are most commonly found in fascicles of 2 and some of 3. The cones are also short and average 1.5 to 2.5 inches long. The cones will often remain on the tree for several years once they have opened which is a good way to identify this species. The bark on mature trees is reddish-brown and the bark plates often resemble jigsaw puzzle pieces and have resin pockets within them.



Shortleaf Pine. Photo Credit: A.C. Moore Herbarium, University of South Carolina.



Virginia Pine. Photo Credit: A.C. Moore Herbarium, University of South Carolina.

Virginia Pine (*Pinus virginiana*) is not a commercially important species due to its less than desirable growth characteristics compared to our other pines. Virginia pine needles are dark yellow-green and are twisted and found in fascicles of 2 that are 1.5 to 3 inches long. The cones are also small at 1.5 to 3 inches long with pronounced prickles that resemble a “needle-like” spine on each scale. If grown in the open, Virginia pine will take on a shrubby appearance. They do not self-prune, are rarely found

over 50 ft tall, and tend to be found in groups in the forest or open areas.

No matter the species, a handy first clue is the number of needles per fascicle. When looking at a mature tree, you may be able to view needles from the ground but be aware the needles you find may be from other pines nearby. Examining the twigs or branching features is another useful tool. Both longleaf and slash pines tend to have large groups of needles near the ends of the twigs. To differentiate between the two, note that longleaf pine twigs remain “thumb-sized” to the tip whereas slash pines decrease rapidly in diameter as they approach the ends more similarly to loblolly pine. Oftentimes, the only easily examined part of the tree is the bark. Unfortunately, variations in coloring, shape, thickness, etc., can make this very difficult, but with time and experience, these clues will become useful in making an overall determination.

See Table 1 on Page 11 for the identifying features to differentiate all 10 pine species found in South Carolina.

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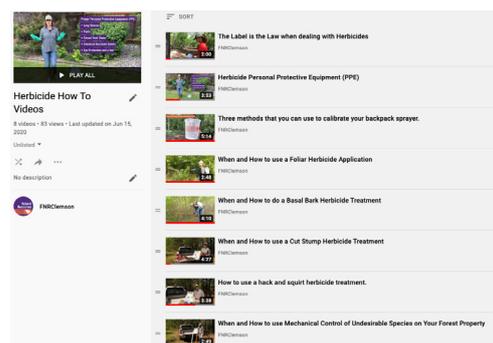
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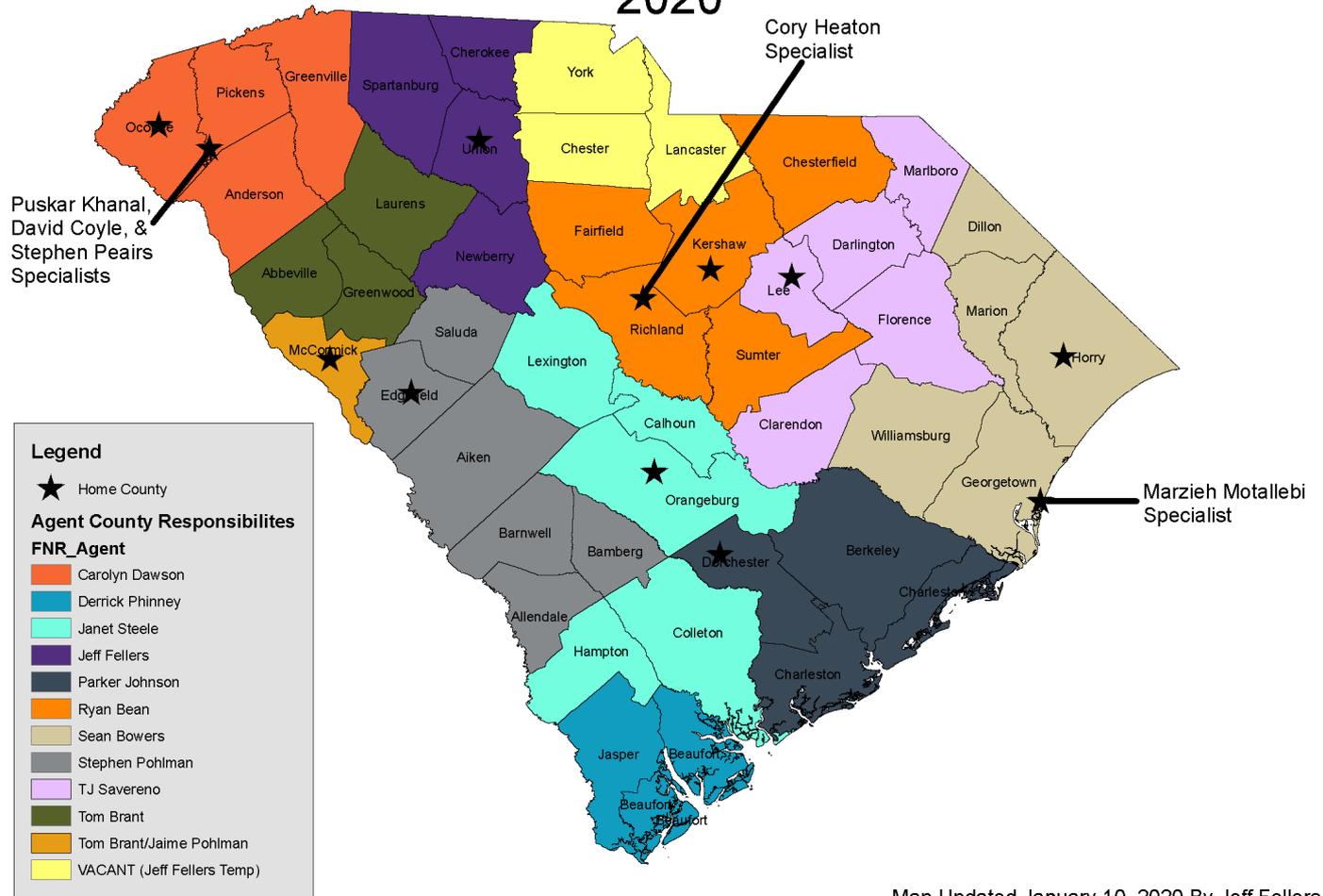


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Table 1. Differentiating Features of Pines in South Carolina.

Pine Tree Species Names	Needles	Twigs	Buds	Bark	Cones	Prickle	Habitat
<i>Pinus taeda</i> Loblolly Pine	3 per fascicle (possibly 2) 3 to 9 inches straight or slightly twisted	moderately stout and rough	brown	dark in color and often deeply furrowed	ovate-conic, persists 3-4 years	short, stout, sharp, pointing toward base, very persistent	widespread
<i>Pinus palustris</i> Longleaf Pine	3 per fascicle (possibly 2) 8 to 12 inches	very stout and very rough	silver	gray to reddish-brown, deeply furrowed, scaly	tapering, slightly curved, fall soon after seed drop	small, sharp, reflexed toward base, persistent	adapted to sandy soils
<i>Pinus elliottii</i> Slash Pine	2 or 3 per fascicle 4 to 10 inches	stout and rough, needles very crowded at tips	brown	orange-brown, flat plates scaly	conical, fall after opening	short, thick	widespread
<i>Pinus echinata</i> Shortleaf Pine	2 per fascicle (possibly 3) 2.5 to 4.5 inches	slender and rough	brown	brownish-red, flat, often short shoots on trunk	ovate-conic, persist for years	small, short, sharp, often fall before mature	piedmont
<i>Pinus virginiana</i> Virginia Pine	2 per fascicle 1.5 to 3 inches strongly twisted yellow-green	spindly, irregular, does not self-prune	brown	dark brown, shallow fissures	ovate-conic, throughout crown	sharp, slender, persistent prickle	primarily piedmont, found statewide
<i>Pinus rigida</i> Pitch Pine	3 per fascicle (possibly 2 or 4) 3 to 5 inches very stiff	thick limbs covered with spur shoots	reddish-brown	reddish-brown, deeply furrowed, epicormic sprouting is common	ovoid, often persistent for many years	short, stout	piedmont, dry ridges or slopes
<i>Pinus strobus</i> Eastern White Pine	5 per fascicle soft, flexible bluish-green	slender, brittle, light brown	yellowish-brown	grayish-brown, deeply furrowed	short stalks, drooping, cylindrical, requires 2 years to mature	none	piedmont, ornamental
<i>Pinus serotina</i> Pond Pine	3 per fascicle (possibly 2 or 4) 5 to 6.5 inches	moderately stout, rough	brown	dark red-brown, narrow plates, forms sucker sprouts after fire or other injury	egg-shaped, mix of opened and un-opened for several years	broad, slender, fragile, straight or curved, fragile	swamps, pond/lake edges, poorly drained soils
<i>Pinus pungens</i> Table Mountain Pine	2 per fascicle (possibly 3) 1 to 2.5 inches	slender, rough	red-brown	red to gray-brown, irregularly checked into scaly plates	ovoid, whorled on branches	large, sharp, hooked	mountains
<i>Pinus glabra</i> Spruce Pine	2 per fascicle 1.5 to 4 inches	slender, reddish-brown	red-brown	rounded top ridges, dark reddish brown, scaly	ovoid, small and round	small, short-incurved	lower coastal plain

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